Anxiety predicts activation of a BNST-anxiety network during early abstinence from AUD.

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Highlights
• Current treatments for AUD do not address anxiety during abstinence, which can lead to relapse.
• Understanding anxiety during abstinence is key to developing novel, effective treatments for AUD.
• We determined neural activation during unpredictable stress in adults in early abstinence and healthy adults.
• In healthy adults, anxiety was associated with greater brain response during anticipation and lesser response during image viewing, suggesting an adaptive anticipatory response.
• In EA adults, anxiety was not associated with an anticipatory response, but did predict greater BNST-anxiety network response to unpredictable threat images.

Methods
• Light social drinkers (HC = 20) and adults with AUD in early abstinence (EA = 19) underwent functional imaging while completing an unpredictable threat task.
• Participants completed several well-vetted anxiety measures to create a composite anxiety score.
• Regression analyses were performed in SPM12 with group (EA/HC), anxiety, and group x anxiety as predictors.
• Whole-brain analyses were completed in SPM12 with α = 0.005 and voxel-threshold (k) = 90.

Graphical Abstract

Graphical Abstract

Methods

Unpredictable Threat Task

HC exhibit a positive relation between anxiety and BNST-anxiety network during cues.

Unpredictable > Predictable Cue

Unpredictable Threat

Unpredictable Threat

HC exhibit a negative relation between anxiety and BNST-anxiety network during threat images.

Average Image

Average Image

Conclusions
• Previous work from our lab highlights the BNST as a central hub for anxiety. Likewise, we recently reported that adults in early abstinence have different structural and intrinsic connectivity compared to healthy controls.
• Data presented suggest that:
  • HC with greater anxiety exhibit greater BNST-anxiety network activation during cue presentation, likely reflecting anticipatory anxiety to images. However, EA do not display this relation between anxiety and BNST-anxiety network activation, likely reflecting lack of preparation.
  • HC with greater anxiety also exhibited lesser BNST-anxiety network activation during unpredictable (vs. predictable) threat images, likely reflecting that they were already prepared for viewing images, whereas EA exhibit a greater relation. This suggests that EA are not prepared for viewing images.
• These data support work that suggests early alcohol abstinence is characterized by dysregulated stress and anxiety.

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Background
• Alcohol use disorder (AUD) is a debilitating, chronic disorder that occurs in 30% of the US population, with rates rising every year.
• Recovery from AUD (abstinence) is possible with current behavioral and pharmacological treatments; however, 50% of individuals relapse within the first year.
• Despite treatments being initially effective, long-term recovery from AUD is thought to be hindered by anxiety and stress that emerges during early abstinence. This anxiety and stress is likely driven by neurobehavioral changes in stress system responding from chronic alcohol use.
• Traditionally, anxiety is thought to stem from activation of the amygdala. However, recent work from our lab and others identifies the bed nucleus of the stria terminalis (BNST) as a hub for the neural anxiety network.
• The present study examines anxiety-related neural activity to unpredictable threat in adults in early abstinence from AUD and healthy controls.

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